

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

WHAT IS CLAIMED IS:

1. A medical device having improved echogenic properties comprising a parabolic surface incorporated into said device, wherein said parabolic surface defines a gas-filled body chamber, said device having a proximal and a distal end.
2. The device of claim 1, further comprising a radioisotopic component inside said body chamber.
3. The device of claim 2, wherein said radioisotopic component comprises ^{26}Al , ^{198}Au , ^{115}Cd , ^{137}Cs , ^{125}I , ^{192}Ir , ^{40}K , ^{32}P , ^{103}Pd , ^{86}Rb , ^{123}Sn , ^{89}Sr , ^{90}Sr , ^{125}Te , ^{90}Y , ^{91}Y , ^{169}Yb or a combination thereof.
4. The device of claim 3 wherein said radioisotopic component comprises ^{125}I or ^{103}Pd .
5. The device of claim 1, wherein said device comprise at least one spacer element connected to said body chamber.
6. The device of claim 5, further comprising a plurality of spacer elements.
7. The device of claim 5, comprising at least one spacer element at said proximal end of said device.
8. The device of claim 5, comprising at least one spacer element at said distal end of said device.
9. The device of claim 6, comprising at least one spacer element at said proximal end and at least one spacer element at said distal end of said device.
10. The device of claim 5, further comprising a plurality of parabolic surfaces, each said parabolic surfaces defining a body chambers.

11. The device of claim 10, wherein said body chamber is connected to a spacer element, wherein said spacer element is connected to at least a second body chamber.
12. The device of claim 1, further comprising a contrast material inside said body chamber.
13. The device of claim 5, said spacer element further comprising a contrast material.
14. The device of claim 13, wherein said contrast material is silver, gold, or tungsten.
15. The device of claim 13, wherein said contrast material is adapted for nuclear magnetic imaging.
16. The device of claim 13, wherein said contrast material is adapted for radiographic imaging.
17. The device of claim 5, further comprising a docking guide operatively attached to said spacer element or to said body chamber wherein said docking guide is at proximal end of said device.
18. The device of claim 17, wherein said docking guide is configured to accept a radioactive source or a spacer.
19. The device of claim 17, wherein said docking guide comprises a flexible joint.
20. The device of claim 17, wherein said docking guide comprises a non-locking docking port.
21. The device of claim 1, wherein said parabolic surface has a density of between 0.5 and 1.5 g/ml.
22. The device of claim 1, wherein said parabolic surface has a density of between 0.8 and 1.2 g/ml.

23. The device of claim 1, wherein said parabolic surface has a density of between 0.9 and 1.1 g/ml.
24. The device of claim 1, wherein said parabolic surface is adapted to provide multiple angles of reflectance for an ultrasonic beam directed at said device.
25. The device of claim 1, wherein said device comprises one or more synthetic polymers.
26. The device of claim 25, wherein said polymer is selected from the group consisting of liquid crystal polymer (LCP), Teflon, carboxylic polymers, polyacetates, polyacrylics, polyacrylamides, polyamides, polyvinylbutyrals, polycarbonates, polyethylenes, polysilanes, polyureas, polyurethanes, polyethers, polyesters, polyoxides, polystyrenes, polysulfides, polysulfones, polysulfonides, polyvinylhalides, pyrrolidones, rubbers, and thermal-setting polymers.
27. The device of claim 26, wherein said polymer is LCP.
28. The device of claim 27, wherein said LCP is an extruded LCP.
29. The device of claim 1, wherein said device comprises a material selected from the group consisting of albumin, cellulose, cellulose derivatives, gelatin, and gut.
30. The device of claim 1, wherein said device comprises one or more metals.
31. The device of claim 30, wherein said metal is titanium.
32. The device of claim 5, wherein said device is adapted to monitor the positioning of said radioisotopic component in a patient.
33. The device of claim 1, wherein said body chamber defines one or more voids, bubbles or channels.
34. The device of claim 33, wherein said void is between 0.1 mm and 0.9 mm in length.

35. The device of claim 34, wherein said void is about 0.5 mm in length.
36. The device of claim 34, comprising 1 - 10 voids.
37. The device of claim 36, comprising 1 void.
38. The device of claim 33, wherein said bubbles are between 0.001 and 0.1 mm in diameter.
39. The device of claim 38, wherein said bubbles are about 0.01 mm in diameter.
40. The device of claim 33, wherein said channels are between 0.001 and 0.1 mm in diameter.
41. The device of claim 40, wherein said channels are about 0.01 mm in diameter.
42. The device of claim 40, wherein said channels spiral at approximately 45° to the long axis.
43. The device of claim 1, wherein said device is adapted for insertion into a mammal.
44. The device of claim 43, wherein said mammal is a human.
45. The device of claim 44, wherein said device is adapted for use in brachytherapy.
46. A method of manufacturing an ultrasonically visible device, said method comprising:
 - (a) obtaining a liquid crystal polymer (LCP) tube comprising a proximal and a distal end;
 - (b) obtaining a LCP spacer element;
 - (c) placing said spacer element in the proximal end of said LCP tube;
 - (d) sealing said proximal end of said LCP tube containing said spacer element; and

- (e) sealing distal end of LCP tube, forming a body chamber, wherein the inner surface of said body chamber is a parabolic surface.
47. The method of claim 46, further comprising the step:
- (f) shaping said body chamber by heating said body chamber to form hemispherical repeating units on said body chamber.
48. The method of claim 47, wherein heating is ultrasonic heating.
49. The method of claim 47, wherein step (f) occurs before steps (c), (d) or (e).
50. The method of claim 46, wherein said spacer comprises a contrast agent.
51. The method of claim 50, wherein said contrast agent is silver, gold or tungsten.
52. The method of claim 46, further comprising a second spacer element.
53. A method of manufacturing an ultrasonically visible device, said method comprising:
- (a) obtaining a liquid crystal polymer (LCP) tube comprising a proximal and a distal end;
 - (b) sealing proximal end of said LCP tube;
 - (c) placing a radioisotopic component into said LCP tube; and
 - (d) sealing distal end of LCP tube, forming a body chamber containing said radioisotopic component, wherein the surface of said body chamber is a parabolic surface.
54. The method of claim 53, further comprising the step:
- (e) shaping said body chamber by heating said body chamber to form hemispherical repeating units on said body chamber.

55. The method of claim 54, wherein heating is ultrasonic heating.
56. The method of claim 54, wherein step (e) occurs before steps (b), (c) or (d).
57. A method of monitoring implant position in a patient comprising:
- (a) inserting a medical device into said patient wherein said device comprising a parabolic surface defining a body chamber and a radioisotope component incorporated into said device;
 - (b) directing an ultrasonic beam at said implant position;
 - (c) reflecting signal from said ultrasonic beam off of parabolic surface;
 - (d) collecting reflected ultrasonic signal; and
 - (e) determining the location of said device in said patient from said reflected ultrasonic signal.
58. The method of claim 57, further comprising surgically extracting tissue from said patient.
59. The method of claim 57, wherein said medical device further comprising a nuclear magnetic or radiographic contrast agent.
60. The method of claim 57, wherein said device is a brachytherapy source.
61. The method of claim 57, wherein more than one of said devices is inserted in said patient.
62. The method of claim 57, wherein said device is used for breast lesion localization.
63. The method of claim 57, wherein said location is determined before an operation.
64. The method of claim 58, wherein said location is determined after extraction of tissue from said patient.